July 10, 1923. **1,461,346**

D. CLERICO

VALVE SPRING COMPRESSOR FOR AUTOMOBILE AND OTHER ENGINES

Filed Jan. 27, 1922

Fig. 1.

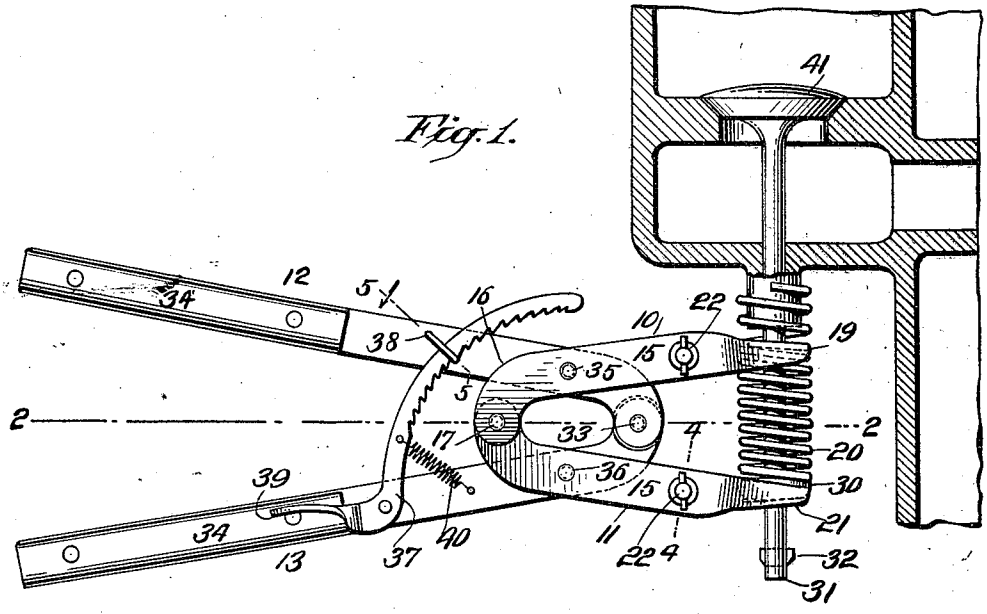


Fig. 2.

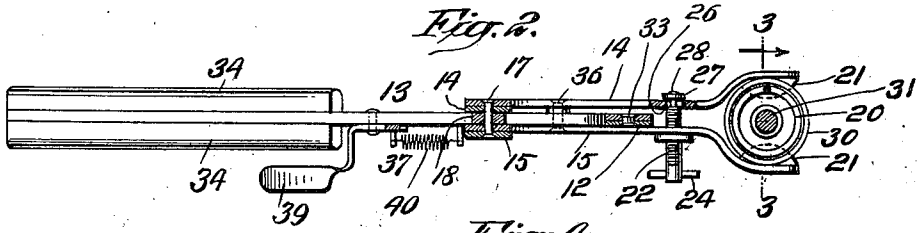


Fig. 4.

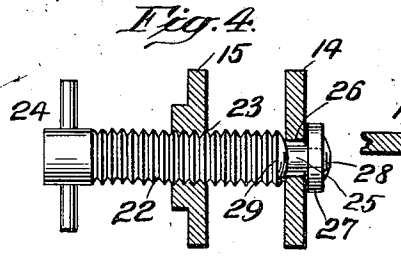


Fig. 5.

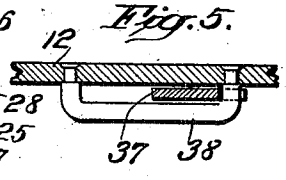


Fig. 3.

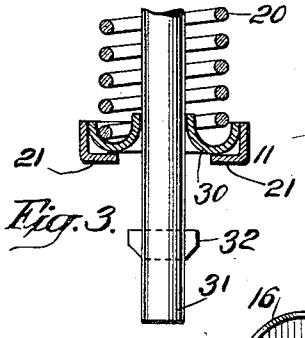


Fig. 6.

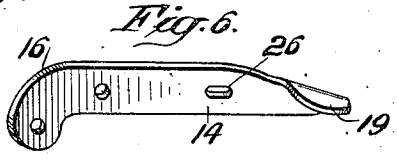
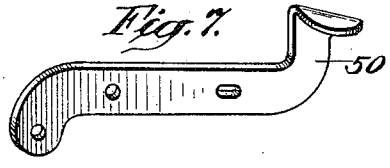


Fig. 7.



INVENTOR:
DOMINICK CLERICO.
BY
Charles C. Gill,
ATTORNEY.

Patented July 10, 1923. 1,461,346

UNITED STATES PATENT OFFICE.

DOMINICK CLERICO, OF YONKERS, NEW YORK.

VALVE-SPRING COMPRESSOR FOR AUTOMOBILE AND OTHER ENGINES.

Application filed January 27, 1922. Serial No. 532,065.

To all whom it may concern:

Be it known that I, DOMINICK CLERICO, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Valve-Spring Compressors for Automobile and Other Engines, of which the following is a specification.

The invention pertains to the class of tools employed for compressing the valve springs of internal combustion engines preparatory to the removal of the valves, and the object of this invention is to provide a highly efficient tool for the purpose mentioned and one adapted to engage the spring either at its upper and lower ends or at intermediate portions at will. A further purpose of the invention is to provide a tool for compressing valve springs which will be efficient in compressing a strong spring with the minimum expenditure of force applied to the handle members of the tool. A further purpose of the invention is to provide a tool of the character in question which will occupy a minimum amount of space and be of extremely durable construction and entirely convenient in use. The tool of my invention is composed of few parts all carried by two handle members.

The spring compressing tool of my invention comprises two jaw members pivoted together at their rear ends and adapted at their forward ends to engage the spring, two handle bars or members pivoted together at their forward ends and pivotally connected with said jaw members between the pivot point thereof and the pivot point of said handle members and a suitable spring-rack for locking the jaw and handle members firmly in position in opposition to the force of a spring that may be held compressed between the jaw members. The jaw members of my tool are also of a construction adapting them for adjustment to the varying sizes of springs in connection with which the tool may be employed.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Fig. 1 is a side elevation of a valve spring compressing tool constructed in accordance with and embodying my invention, the tool being shown in operative position holding the valve spring of an internal combustion engine under compression, a portion of the engine being shown in section;

Fig. 2 is a horizontal section through the same, taken on the dotted line 2—2 of Fig. 1;

Fig. 3 is a vertical section, partly broken away and on a larger scale, of a portion of the same taken on the dotted line 3—3 of Fig. 2;

Fig. 4 is a vertical transverse section, on a larger scale, through a portion of the same, taken on the dotted line 4—4 of Fig. 1;

Fig. 5 is a detail section through a portion of the same, taken on the dotted line 5—5 of Fig. 1;

Fig. 6 is a detached perspective view of one of the jaws of the tool, and

Fig. 7 is a corresponding view showing a modified form of jaw adapted for the tool.

In the drawings, 10, 11, respectively, designate the jaw members of the tool, and 12, 13, respectively, the handle members thereof.

The jaw members 10, 11 are each composed of two side by side bars 14, 15, as shown in Fig. 2, and these bars of the respective jaw members curved toward each other at their rear portions, as at 16, and are pivotally connected by means of the pivot 17. The bar 15 of the upper jaw member 10 laps upon the outer face of the rear end of the bar 15 of the lower jaw member 11, as shown in Figs. 1 and 2, and the bar 14 of the upper jaw member 10 laps upon the inner face of the rear end of the bar 14 of the lower jaw member 11, as shown in Fig. 2, and the rear ends of the bar 14 of the upper jaw and the rear end of the bar 15 of the lower jaw are spaced apart at the rivet 17 by a bushing 18. The bars 14, 15 of the jaw member 10 are of reduced vertical height at their forward ends and flanged inwardly toward each other to form lips 19 adapted to engage an upper portion of the convolutions of the spring 20. In Fig. 6 I illustrate the bar 14 of the upper jaw-member 10, and the bar 15 of the upper jaw member 10 is a counterpart of the bar 14, with the exception that its lip 19 for engaging the spring projects inwardly in a direction toward the lip 19 of the bar 14. The lower bars 14, 15 comprising the lower jaw 11 are similar to the bars 14, 15 of the jaw 10, except that the lips 21 for engaging a lower portion of the spring 20 project toward each other from

the lower edges of the forward ends of said lower bars, whereas the lips 19 on the bars 14, 15 of the upper jaw 10 project toward each other from the upper edges of the forward ends of the bars. The bars 14, 15 of each of the jaws 10, 11 are adjustable toward and from each other to adapt the tool for varying sizes of springs, by means of a screw 22 passing through a threaded hole 23 in the bar 15 and having a handle 24 on one end and a reduced stem 25 on the other end which passes through a hole 26 in the bars 14. The reduced stems 25 of the screws 22 are retained in engagement with the bars 14 by means of a washer 27 and rivet head 28. The forward threaded portions of the screws 22 are rounded at 29 at the point where the screws engage the bars 14 at the holes 26. The holes 26 are in the form of elongated slots, as shown in Fig. 6, these slots permitting of the adjustment of the bars 14, 15 toward and from each other by means of the screws 22 without undue straining or binding of the parts. The rounded portion 29 on each screw 22 facilitates the rotation of the screw and its seating against the bar 14 during the adjustment of the bars 14 and 15 of the jaws toward and from each other.

The jaws 10, 11 correspond in all essential particulars with each other, except that one jaw has its parts arranged reversely to the other, and consist of the spaced-apart bars 14, 15, screws 22 for adjusting the bars toward and from each other and lips to engage the convolutions of the spring 20, or, as may be desired, an upper convolution of the spring and the bottom of the usual washer 30 located on the valve stem 31 above the removable cotter pin 32 provided to take the expansive force of the spring in a customary manner. The jaws 10, 11 being pivoted at 17 have a movement toward and from each other at their forward ends, which become bifurcated by the spacing apart of the bars 14, 15 and may straddle the valve stem 31 and enter the convolutions of the spring 20 as closely as may be required to the opposite sides of said stem. One important feature of the jaws 10, 11 is that the upper lips 19 for the upper jaw incline upwardly and rearwardly, as shown in Fig. 6, and that the lips 21 of the lower jaw incline downwardly and rearwardly correspondingly with but reversely to the inclination of the upper lips 19. The purpose of thus arranging the lips 19, 21 is to avoid any tendency of the spring 20 to spring outwardly from between the jaws 10, 11, the inclination of the lips 19, 21 serving to compel the expansive force of the spring to slide the spring in a direction toward the handles of the tool. When the jaws of the tool are about in their final position of outward adjustment, the lips 19, 21 pass into what may be said to be nearly a horizontal plane, as indicated in Fig. 1, but at that time the spring is in its final state of compression and there is still enough inclination left in the lips 19, 21 to safely hold the spring.

The handle members 12, 13 are in the form of two flat bars which extend forwardly and at their forward portions curve toward each other and are secured together in a pivotal manner by a rivet 33. The outer portions of the handle members or bars may be equipped with wooden hand pieces or scales 34. The handle bars are flat and the upper handle bar passes between the bars 14, 15 of the upper jaw 10, while the lower handle bar passes between the bars 14, 15 of the lower jaw 11. The handle bar 12 is pivotally secured to the bars 14, 15 of the upper jaw 10 by a rivet 35 and the lower handle bar 13 is secured to the bars 14, 15 of the lower jaw 11 by a rivet 36. The rivets 35, 36 are on the same vertical plane, as shown in Fig. 1, and the plane of these rivets is midway between the pivot points 17, 33. In view of the manner of assembling the handle bars 12, 13 with the jaws 10, 11, it will be seen that, when the handle bars are moved at their rear or handle ends in a direction outwardly from each other, the rivets 35, 36 will cause the jaws 10, 11 to turn outwardly from each other at their forward ends, and that when the outer portions of the handle bars are moved toward each other, said bars will, through the rivets 35, 36 close the jaws 10, 11 toward each other. For the purpose of locking the handle bars and jaws against outward movement due to the expansive force of the spring 20 acting against the forward ends of the jaws, I provide a curved rack bar 37 on the handle member 13 and a loop 38 on the handle member 12 and through which lock said rack extends. The rack 37 is pivoted on the handle-bar 13 and is equipped with a thumb-piece 39 for convenience in operating it. A coiled spring 40 connects the rack 37 with the handle bar 13 and serves to place a tension on the rack causing the teeth along its inner edge to engage the inner lower edge of the loop 38. The rack 37 with its spring 40 and loop 38 operates to lock the handle-bars against outward movement, but when said handle bars are in an outward position they may be freely closed together, since at that time the loop 30 will ride down the inclined faces of the teeth of the rack 37.

When it is desired to remove the valve 41, the handle bars 12, 13 will be opened outwardly to the requisite extent for properly spreading the forward ends of the jaws 10, 11, and said jaws will then be forced upon the spring 20 either in the position shown in Fig. 1 or in any other relation to the spring that may be convenient, and

thereupon the handle bars will be closed toward each other and effect a corresponding movement in the forward ends of the jaws 10, 11 causing said jaws to compress the spring between them. When the spring 20 is in a state of compression its strain is relieved from the cotter pin 32 and the latter may be removed, and thereupon the tool may be utilized to lower the spring from off the valve spindle or stem 31, thus freeing the valve 41 for removal. When the valve 41 is returned to the engine, the spring 20 while held by the tool may be reapplied, in its state of compression, upon the valve stem 31 and thereafter the cotter pin 32 may be restored to position, whereupon the operator will press against the thumb-piece 39 to free the rack 37 from the loop 38 and permit the expansive force of the spring 20 to move the forward portions of the jaw members 10, 11 and the rear portions of the handle bars 12, 13 in a direction from each other, the hands of the operator preferably remaining on the handle bars so as to prevent a too sudden action of the spring in regaining its former condition. After the spring 20 has become expanded, the tool may be removed therefrom.

The tool is composed of few parts and these parts are very durable, being in the form, mainly, of flat bars arranged on edge. The manner of arranging and pivoting the jaw members to the handle bars is also important, since thereby the forward ends of the jaws may have a considerable range of movement. The tool is also one of great compactness in that when the handle bars are closed together as nearly as they may be, said bars and the jaws 10, 11 are substantially parallel and as close together as the curved inner ends of the handle bars and jaws permit, and at this time also the rack 37 folds down close to the upper jaw 10 and at its forward end enters in between the bars 14, 15 of said jaw 10.

I do not limit my invention to all of the details of form and construction shown and described, since I am aware that some of these details may be modified within the scope of the appended claims. I may add also that for some makes of engine the forward portions of the jaws 10, 11 may be modified in shape, and in Fig. 7 I illustrate a modified form of bar for the upper jaw 10. When the bar shown in Fig. 7 is made use of, the other bar for the same jaw will harmonize with the one shown in Fig. 7. The modification consists in extending the forward end of the jaw upwardly, as at 50, instead of having the end project substantially straight forwardly in the manner shown in Fig. 1. If I make use of bars corresponding with that shown in Fig. 7 for one of the jaws 10, 11, the other jaw may retain the shape in which it is shown in Fig. 1. The forward ends of the jaw members 10, 11 will therefore vary with requirements. The jaws 10, 11, as shown, meet a wide range of application and therefore only in special instances will a modification of these jaws be necessary.

What I claim as my invention and desire to secure by Letters Patent, is:

1. A tool of the character described comprising two coacting jaw members provided with jaws on their forward ends adapted to be engaged with a spring and at their rear ends being turned toward each other and pivoted together, two handle bar members turned toward each other at their forward ends and pivoted together and crossing said jaw members forwardly of their pivot and being pivotally secured thereto, and a rack normally resisting outward movement apart of said jaw members and handle bar members.

2. A tool of the character described comprising two coacting jaw members provided with jaws on their forward ends adapted to be engaged with a spring and at their rear ends being turned toward each other and pivoted together, two handle bar members turned toward each other at their forward ends and pivoted together and crossing said jaw members forwardly of their pivot and being pivotally secured thereto, and a rack normally resisting outward movement apart of said jaw members and handle bar members, said jaw members each being formed of two spaced-apart corresponding bars and having means for securing said bars in adjusted relation to each other, and said bars of each jaw member having inturned lips to pass within the outer vertical plane of the convolutions of the spring.

3. A tool of the character described comprising two coacting jaw members provided with jaws on their forward ends adapted to be engaged with a spring and at their rear ends being turned toward each other and pivoted together, two handle bar members turned toward each other at their forward ends and pivoted together and crossing said jaw members forwardly of their pivot and being pivotally secured thereto, and a rack normally resisting outward movement apart of said jaw members and handle bar members, said jaws having inwardly turned lips to pass within the outer vertical plane of the convolutions of the spring and vertical sides to straddle the spring and said lips being inclined inwardly and outwardly to prevent the jumping out of the spring from the jaws.

4. A tool of the character described comprising two coacting jaw members each composed of two corresponding bars, said bars being adapted at their forward ends to straddle a spring and having inturned lips to pass within the outer vertical plane of

the convolutions of the spring, and said jaw members being turned toward each other at their rear ends and pivoted together, and two handle bar members turned toward each other at their forward ends and pivoted together and crossing said jaw members forwardly of their pivot and being pivotally secured thereto, said jaw members and handle bar members when closed mainly lying on substantially parallel planes and in near relation to each other.

5. A tool of the character described comprising two coacting jaw members provided with jaws on their forward ends adapted to be engaged with a spring and at their rear ends being turned toward each other and pivoted together, two handle bar members turned toward each other at their forward ends and pivoted together and crossing said jaw members forwardly of their pivot and being pivotally secured thereto, a rack pivoted to one of said handle bars and being forwardly and inwardly curved and extending through a loop on the other handle bar and serving to normally resist outwardly opening movement of said jaws and handle bars, and a spring secured to said rack and to the handle bar to which it is pivoted, said rack having a thumbpiece by which the rack may be freed to slide through said loop in opposition to the force of said spring.

6. A tool of the character described comprising two coacting jaw members each composed of two corresponding bars, said bars being adapted at their forward ends to straddle a spring and having inturned lips to pass within the outer vertical plane of the convolutions of the spring, and said jaw members being turned toward each other at their rear ends and pivoted together, and two handle bar members turned toward each other at their forward ends and pivoted together and crossing said jaw members forwardly of their pivot and being pivotally secured thereto, said handle bar members lapping upon one another at their forward pivoted together ends and extending between the bars of said jaw members at the points where they are pivoted thereto, and said bars of the upper jaw member at their rear ends extending beyond the corresponding portions of the bars of the lower jaw member where said jaw members are pivoted together.

Signed at New York city, in the county of New York and State of New York, this 24th day of January, A. D. 1922.

DOMINICK CLERICO.